

NEWA (Network for Environment and Weather Applications) 2018: A Year in Review

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Collaborators:

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NEWA state coordinators (year joined):

Terence Bradshaw, University of Vermont, Burlington, VT - Vermont (2010)

Jon Clements, University of Massachusetts Extension, Belchertown, MA - Massachusetts (2011)

Peter Oudemans, Rutgers, The State University, Chatsworth, NJ - New Jersey (2011)

Robert Crassweller, Penn State University, University Park, PA - Pennsylvania (2013)

Mary Concklin, University of Connecticut Extension, Storrs, CT - Connecticut (2014)

JP Jacobson, Minnesota Apple Growers Association, White Bear Lake, MN - Minnesota (2015)

Michael Parker, North Carolina State University, Raleigh, NC - North Carolina (2016)

Mizuho Nita, Virginia Tech, Winchester, VA - Virginia (2016)

Cheryl Smith, University of New Hampshire, Durham, NH - New Hampshire (2016)

Keith Mason, Michigan State University, East Lansing, MI - Michigan (2017)

Melanie Ivey, The Ohio State University, Wooster, OH - Ohio (2017)

Amaya Atucha, University of Wisconsin-Madison, Madison, WI - WI (2018)

MM Rahman, University of West Virginia, Morgantown, WV (2018)

Abstract

The Network for Environment and Weather Applications (NEWA) delivered over 40 insect, plant disease, crop management, degree day, and weather summary models to locations across 28 US states in 2018. Website contact hours increased 12.6%, compared to 2017, resulting from continued network expansion including the new member states of Wisconsin and West Virginia. Total weather stations increased to 638, up 5.6% from 2017 and up 48% since 2016. NEWA user support was expanded with an online help desk, which was used to resolve 472 issues through 2112 email or phone interactions. 17 NEWA presentations were given, 11 in New York alone, at

multiple venues using different formats for apple, grape, and general audiences. 27 articles or reports were published. The design and build process for an updated NEWA website achieved important strategic planning and end user research milestones, which will be utilized in 2019.

Introduction

The Network for Environment and Weather Applications (NEWA) is a collection of online insect pest and plant disease management tools built to provide growers with short-term crop risk assessments. Each tool or resource uses real-time weather data streamed from 638 weather stations across the Northeast, Midwest, and Mid-Atlantic United States and can be accessed at newa.cornell.edu. NEWA is part of the New York State IPM Program (NYSIPM) at Cornell University.

Objectives

- 1) Operate and maintain NEWA
- 2) Track and promote NEWA usage
- 3) Update the NEWA website and pest forecast models

Procedures, Results, and Discussion

1. Operate and maintain NEWA

User support

An online support desk was launched in February 2018 to manage all NEWA support requests. 472 tickets were created between launch and December 31, resulting in 2,112 email and phone interactions with end users. Top request categories were 1) station purchase or onboard inquiries, 2) station outage reporting, and 3) website error messages.

Station maintenance and data quality control (QC)

A station outage messaging system continued in 2018, originally developed by current and former NYSIPM staff J. Carrol and J. Gibbons with collaboration from Northeast Regional Climate Center (NRCC) staff R. Moore, K. Eggleston, and J. Carroll (NYSIPM). Email alerts are sent to station owners, with a Cc to respective NEWA state coordinators, at 1d, 7d, and 21d. NRCC also completed work on a NEWA data QC manager, which flags potentially erroneous data. The QC system was funded by a USDA National Institute of Food and Agriculture Crop Protection and Pest Management Applied Research and Development Program (USDA NIFA ARDP) grant. Explanation of how to use the QC system was presented by K. Eggleston (NRCC) in January 2019. J. Carroll and D. Olmstead are developing a survey to gather comments and feedback regarding next steps.

Table 1. State-level weather station activity summary for the 2018 calendar year.

State	2017 locations (inc. airports)	2018 starting stations	2018 new stations	2018 deactivated stations	2018 airport locations	2018 all locations	1-yr change (%)
CT	46	43	0	-12	3	34	-26.1
IA	4	2	0	0	2	4	0.0
IL	9	6	1	-3	3	7	-18.2
KY	3	1	0	0	2	3	0.0
MA	40	19	1	-5	21	36	-10.0
MD	4	1	0	0	3	4	0.0
MI	97	82	0	0	15	97	0.0
MN	20	15	0	-2	5	18	-10.0
NC	23	9	1	0	14	24	+4.3
NE	2	1	0	0	1	2	0.0
NH	20	11	1	0	9	21	+5.0
NJ	58	44	1	0	14	59	+1.7
NY	142	109	29	-13	33	158	+11.3
OH	29	17	5	0	12	34	+17.2
PA	27	14	4	-1	13	30	+11.1
VA	20	7	4	-1	13	23	+15.0
VT	16	11	1	0	5	17	+6.3
WI	0	0	26	-2	19	43	-
WV	0	0	1	0	1	2	-
Totals	560	392	75	-39	188	616	+10.0

2. Track and promote NEWA usage

Unique NEWA model users

End users completed 3168 hours of direct web site interaction while using NEWA models and weather resources in 2018, up 12.3% compared to 2017 (2821 h). A summary of NEWA resources accessed by web site users, tracked with Google Analytics, users shows continued gains for fruit and weather resources since 2016. Apple insect models, the potato diseases model, and the degree day calculator showed the greatest percent increases in respective categories compared to 2017 (table 2).

Table 2. Summary of 2016-2018 NEWA users organized by online resource access. Users are unique within the past three years based on device IP address.

Category	Resource	Users				2018 % change	
		2016	2017	2018	3-yr avg	vs '16	vs '17
Apple	Diseases	1943	2352	2495	2263	+28.4	+6.1
	Carbohydrate thinning	970	1441	1308	1240	+34.9	-9.2
	Insects	796	1099	1179	1025	+48.1	+7.2
	Apple irrigation	485	534	548	522	+13.0	+2.6
Grape	Diseases/Grape berry moth	899	931	1001	944	+11.3	+7.5
Vegetable	Cabbage maggot	255	283	238	259	-6.7	-15.9
	Onion diseases	109	141	110	120	-0.1	-21.9
	Onion maggot	105	218	140	154	+33.3	-35.8
	Potato diseases	80	177	225	161	+181.3	+27.1

	Tomato diseases	655	635	563	618	-14.0	-11.3
Weather	Daily summaries	1082	980	1090	1051	+0.7	+11.2
	Degree day calculator	739	853	1175	922	+59.0	+37.7
	Degree day summaries	2324	2766	3956	3015	+70.2	+30.0
	Hourly summaries	1591	1366	1663	1540	+4.5	+21.7

NEWA user survey

A NEWA survey assessing grower impact, needs, and priorities to set the stage for the NEWA website rebuild was completed. The NYS IPM Program Report, *The Network for Environment and Weather Applications: 2017 Survey of Impacts and User Insights*, is available online at <https://hdl.handle.net/1813/60637>

NEWA expansion

Wisconsin and West Virginia joined NEWA in early 2018, bringing total state level membership to 14 (Connecticut, Massachusetts, Michigan, Minnesota, New Hampshire, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Vermont, Virginia, West Virginia, and Wisconsin). A net gain of 33 stations was also achieved in 2018, raising the total number of network-wide stations to 638, a gain of 5.6% compared to December 31 2017 (605) and 48.0% since December 31 2016 (431).

Other collaboration

NEWA and the New York State Mesonet, part of the University at Albany (NYSM), launched a data sharing collaboration in March 2018. Ten NYSM locations of special interest to NY farmers were linked to NEWA. The goal of this project is to increase grower accessibility both to NEWA resources and high quality NYSM data streams. Discussions are ongoing regarding ways to expand this collaboration to include additional NYSM location. More information about 2018 progress is available at <http://blogs.cornell.edu/yourenewa/2019/01/24/nysmesonet-2018-review/>.

Presentations

Presenter	Conference or Meeting	Sponsor	Location	Title	# people	hrs	contact hours	Date
Olmstead and Carroll	Ohio Produce Network	Ohio produce growers and marketers association	Sandusky, OH	About NEWA, navigation, and weather stations	29	.17	5	1/15/2018
Olmstead	Empire State Producers Expo	New York State Vegetable Producers Association	Syracuse, NY	NEWA: The Network for Environment and Weather Applications	31	.66	20	1/17/2018
Carroll and Olmstead	Wisconsin Fresh Fruit and Vegetable	Wisconsin apple growers association	Wisconsin Dells, WI	Using the NEWA network for apples	80	.25	20	1/22/2018

	Conference 2018							
Carroll and Olmstead	Wisconsin Fresh Fruit and Vegetable Conference 2018	Wisconsin berry growers association	Wisconsin Dells, WI	NEWA weather stations - benefits to berry growers (joint presentation with Julie Carroll)	25	.17	4	1/22/2018
Olmstead	2018 Grape Growers Conference	Lake Erie Regional Grape Program	Fredonia, NY	NEWA - Where we are and where we are heading	100	.5	50	3/14/2018
Olmstead	9th International IPM Symposium	IPM Institute of North America	Baltimore, MD	The Network for Environment and Weather Applications	25	1.25	31	3/21/2018
Olmstead, Carroll, Weigle, Grant, Petzoldt	9th International IPM Symposium	IPM Institute of North America	Baltimore, MD	Grower valuation of the Network for Environment and Weather Applications	n/a	n/a	n/a	3/21/2018
Carroll, Cox, Olmstead	Ohio Produce Network	Ohio produce growers and marketers association	Voorheesville, NY	NEWA hands-on workshop session 1 - grapes and small fruit	6	.33	2	3/28/2018
Olmstead	2018 Grape Processor reps meeting	Lake Erie Regional Grape Program	Portland, NY	NEWA update and future directions	12	0.5	6	4/4/2018
Weigle	LERGP Podcast	Lake Erie Regional Grape Program	Portland, NY	Do you NEWA?	-	-	-	4/4/2018
Olmstead and Weigle	2018 NGP Webinar series	Northern Grapes Project	Online	Implementing NEWA weather and pest model information into a vineyard management strategy	35	1.0	35	4/10/2018
Olmstead and Weigle	LERGP Podcast	Lake Erie Regional	Portland, NY	Dan Olmstead on NEWA	-	-	-	4/14/2018

		Grape Program						
Olmstead and Cox	ENTOM 4400 IPM Lab	Cornell University	Ithaca, NY	Using NEWA for IPM: ENTOM 440 Lab	41	2.5	102	5/1/2018
Olmstead	Finger Lakes Grape Twilight meeting	Finger Lakes Grape Program	Lodi, NY	Finger Lakes Grape Program Twilight Meeting: Updates on NEWA	85	.25	21	5/15/2018
Olmstead	New Hampshire Extension NEWA training	University of New Hampshire	Online	UNH Webinar: Introduction to NEWA	7	.5	3.5	5/24/2018
Weigle	LERGP Podcast	Lake Erie Regional Grape Program	Portland, NY	Grape Berry Moth scouting on NEWA	-	-	-	7/3/2018
Olmstead	Winter field crops monthly call	NYS IPM	Online	Winter field crops monthly call: The Network for Environment and Weather Applications	15	1	15	11/1/2018
Olmstead	CCE Agricultural In-service	Cornell Cooperative Extension	Ithaca, NY	CCE Ag Inservice: NEWA introduction and updates	20	1	20	11/14/2018
Olmstead	Conesus Lake Watershed Association	Conesus Lake Watershed Association	Lakeville, NY	Conesus Lake Association: Getting Started with NEWA	5	2	10	11/15/2018

NEWA data access

35 data licenses, using NEWA weather station sources, were generated for use with RIMPro apple management software (<http://rimpro.eu>) in support of New York State and Massachusetts apple producers in 2018 and licenses will again be provided in 2019 for this group. I explored the possibility of developing an API with NRCC programmers, as suggested by RIMPro developer Marc Trapman, but time and resources are limited at this time. We will continue with a URL-based csv file format that can be accessed by the RIMPro platform. 35 licenses were provided in 2018, generating net revenue of \$947 for NEWA.

NEWA blog

The "Your NEWA" blog, <http://blogs.cornell.edu/yournewa>, had 463 subscribers as of December 31 2018. The 27 blog posts promoted the NEWA 10-year survey, grant projects, annual reports, state coordinators, weather station maintenance, New York state extension cooperators, webinars, degree day reports, website incident reporting, the help desk, model improvements, the use of backup weather data, historical data access, and web site user statistics. See 'Publications' for a complete listing.

3. Update the NEWA website and pest forecast models

Website maintenance

Regular updates, primarily for security purposes, to the current NEWA content management system, a backend organizational platform, were made by ITX, the website host, on a quarterly basis in 2018. A 'Help' link was added to the main navigation bar in February to complement new online support features for growers and station owners.

Website rebuild

The NEWA website is currently under review and slated for rebuild and launch in winter 2019/2020. Significant progress was completed on this project including the survey of end user needs, content mapping, and strategic planning. Specific accomplishments include the following items.

- ITX Corp hosted a day-long workshop for NEWA stakeholders in Pittsford, NY on 6 March 2018.
- Julie Carroll and I completed a report detailing results of a comprehensive online survey of NEWA users and non-user's member states (13 at the time of survey distribution)
- In December, final steps were taken to proceed with a full rebuild of the NEWA website.

Model updates

Cercospora leaf spot of table beets. Validation work was completed by Sarah Pethybridge (Cornell University, Department of Plant Pathology and Plant Microbe Biology) in 2018. A second year of validation is planned for 2019.

Ornamental insect pests. Elizabeth Lamb with NYSIPM continued work building a degree day database for ornamental insect pests including white pine weevil, spruce spider mite, balsam twig aphid, Douglas-fir needle midge, elongate hemlock scale, balsam wooly adelgid, bronze birch borer, boxwood leafminer, and apple blotch leafminer.

Berry models. Validation work for blueberry maggot, strawberry anthracnose, strawberry Botrytis, and cranberry fruitworm was completed by Juliet Carroll, Kerik Cox (Cornell University, Department of Plant Pathology and Plant Microbe Biology), and Greg Loeb (Cornell University, Department of Entomology). The blueberry maggot model will go live in 2019. Additional validation work will be done in 2019 on cranberry fruitworm and strawberry diseases.

Western bean cutworm. A second year of field validation data was collected in 2018 by a team of NYSIPM and Extension personnel. Olmstead is validating accuracy of 25% flight emergence in early 2019.

Weed emergence. Work continues on emergence models for large crabgrass, giant foxtail, yellow foxtail, common lambsquarters, eastern black nightshade, smooth pigweed, common pigweed, common ragweed, and velvetleaf. Tony DiTommaso (Soil and Crop Sciences, Cornell University) is project lead.

Grants

PI(s)	Term Date	Title	Grantor
Grant, Carroll, DeGaetano	9/30/2019	Building the Network for Environment and Weather Applications (NEWA) Supporting Sustainable Farming	Federal Capacity Funds, Smith-Lever
Carroll, Grant, DeGaetano	8/31/2019	Building a responsive network of integrated pest management applications that supports grower access and communication	USDA NIFA CPPM ARDP
Grant, Lamb, Gangloff-Kaufmann, Seaman, Carroll, Wise	6/31/2020	An integrated pest management program for New York State 2017-2020	USDA NIFA CPPM EIP
Weigle, Martin, Olmstead, and Amidon		Increasing the Reliability and Scope of NEWA Weather and Pest Model Information in the Lake Erie Region.	LERGREP Inc. and NY Wine and Grape
Lamb and Eshanauer		Insects On-line: Forecasting insect management for nursery and Christmas tree growers.	NY Farm Viability Institute

Publications

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